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MALARIAL FEVER : HOW IT IS CAUSED
AND HOW IT MAY BE PREVENTED

Ronald ROSS

South African Anti-Malarial Association



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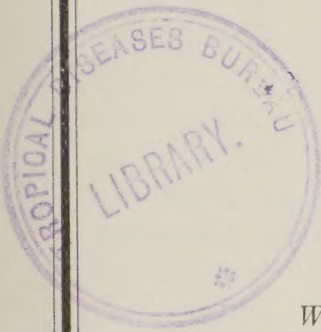
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Malarial Fever : How it is Caused and how it may be Prevented.

BY

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Malarial Fever: How it is Caused and how it may be Prevented.

Written specially for the South African Anti-Malarial Association by SIR RONALD ROSS, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., Professor of Tropical Medicine, University of Liverpool, and Liverpool School of Tropical Medicine.

Malarial fever is known also by the names, Ague, Intermittent Fever, Swamp Fever, Jungle Fever, and Paludism.

It is the most prevalent of all diseases in the tropics and causes from a quarter to a half the sickness in many localities and countries which have a warm climate. Fortunately it is not very fatal; but, as it attacks so many people, and makes them ill for such long periods, it has a very disastrous influence on public health in most warm climates. In parts of Africa, India, and elsewhere, almost all the native children are infected from birth until they reach about 12 years of age, after which they become partially immune. Europeans have been known to suffer for a number of years after leaving the country in which they first became infected.

The first symptoms of infection are those of regularly repeated attacks of fever. The fever generally begins with shivering, followed by high temperature and profound perspiration—after which the symptoms subside for a time. In one, two or three days, according to the nature of the infection, the fever recommences; and these attacks succeed each other for weeks. The patient may now improve, with or without treatment, for a few weeks; but if his treatment has not been sufficient, he is now very liable to relapses; and may suffer from these for years. In old cases the patient becomes pale and weak, and

frequently suffers from very considerable enlargement of the spleen. In this condition he is not able to do much work; he is constantly feeling sick with the relapses of fever. Sometimes, however, what are called pernicious attacks may intervene and may kill him outright; and the most deadly of any such attacks are known by the name of Blackwater Fever, which is very fatal, and which often occurs in patients who have not undergone proper treatment with quinine.

The disease is caused by enormous numbers of microscopical parasites which live in the red corpuscles of the blood. They enter the blood through the proboscis of certain kinds of mosquitos known as Anophelines. Although at the moment of inoculation only a few of these parasites may be introduced, they multiply at such a rate that after a week or two they may number many hundreds of millions. At first, while their numbers are small, the patient does not feel their presence; but when they have multiplied sufficiently he goes down with the usual attack of fever. It should be understood that the parasites may continue to reproduce themselves in his blood for years, although he may no longer be subject to the bites of mosquitos—as, for instance, when he returns to Europe. If the parasites are present in the blood, anything that depresses him, such as fatigue, chills, dissipation, or exposure to great heat, is likely to increase their numbers and to produce a relapse of fever.

It may now be asked how the parasites enter the proboscis of the Anopheline mosquitos. They do so by a very simple process which is now thoroughly known to science. When a patient who has many parasites in his blood is bitten by one of these mosquitos, the insect draws up together with his blood, a number of the little parasites; and these multiply in the insect's body and produce spores, which pass into its proboscis. The development of the parasites in the Anopheline takes about one week; and after this the infected insect is capable of infecting, in its turn, any human being which it bites. Thus

the parasites pass alternately from man to the mosquito and from the mosquito to man—a history which is by no means extraordinary and which is known to occur in a vast number of parasites of man, animals and plants. Thus the new-comers to the tropics or other healthy people are most likely to become infected in places where there are already large numbers of infected persons, or large numbers of Anopheline mosquitos. Such persons can always reduce the chances of becoming infected by living at a distance from infected persons (such as native children), by using mosquito nets with care, or by taking quinine.

The treatment of malarial fever by quinine has been known for some centuries. Patients suffering from the disease should always consult a medical man as to such treatment, and should take the drug regularly for three or four months after his last attack of fever. If he does not take sufficient quinine, or does not continue it long enough, the parasites will be only slightly reduced in numbers, and will shortly multiply again and again prostrate him with fever. The following precautions should be taken by everyone who lives in a malarious place.

A mosquito net should invariably be used during the night. It should be free from any holes and should be so carefully tucked under the mattress that no mosquitos are able to enter. If the smallest aperture remains, the insects will easily gain admittance, and may produce infection.

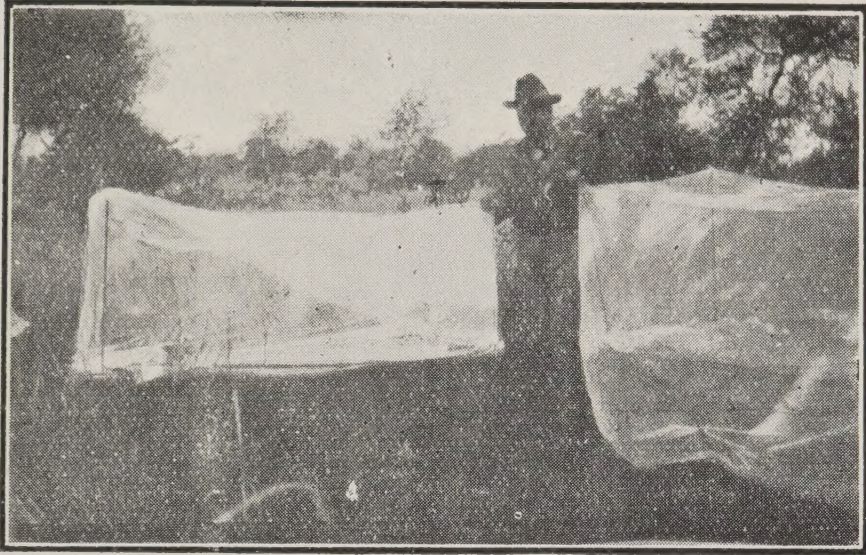
In addition to the use of mosquito nets, everyone who is called upon to live in a very malarious place should take a certain amount of quinine as a preventative during the malaria season. As a rule, five grains of quinine taken every morning just before breakfast is the best way of using the drug. Some persons can easily take more than this without bad effects.

Everyone in the tropics should take care not to breed mosquitos in his house or garden. The insects develop from larvae, commonly called wrigglers, which are found in any old or stagnant collections of water,

such as rain water in flower pots, empty biscuit tins, and buckets, calabashes, water cisterns, tubs, badly made drains, roof gutters, holes in rocks, or holes in trees. Thus every householder should always collect such things as empty tins, broken bottles and other rubbish in one place out of the rain, and should see that water cisterns and tubs are properly screened against the entry of mosquitos. He can also easily cause holes in rocks and trees to be filled up with a little gravel or concrete. If these measures do not suffice to reduce the mosquitos in his house, he should lodge frequent complaints with the local sanitary department or municipality, who should employ men for the special purpose of keeping down the mosquitos.

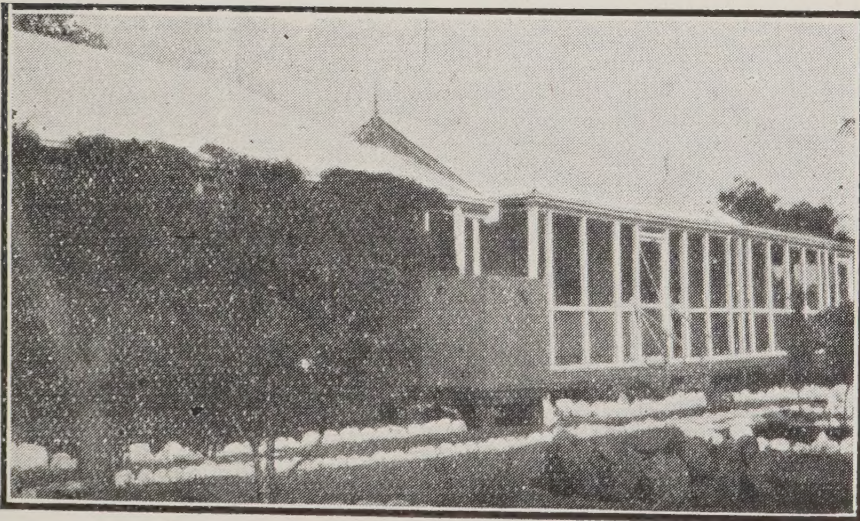
On a large scale malaria can always be reduced by the local authorities, either by distributing quinine amongst the poor people, selling it to the well-to-do, issuing instructions, or by undertaking such drainage or other operations as will suffice to reduce the *Anophelines* in the district. Such anti-malaria campaigns require the proper organisation and the expenditure of a small amount of money for payment of labourers, etc. In order to meet such expenditure, the local authorities may have to charge a small tax; but this is so small that few householders should object to pay it. Thus at Port Said, in Egypt, the mosquitos have been almost entirely banished at the cost of fivepence per head of population per annum, with immense benefit both to the health and to the comfort of everyone in the town. The cost may be a little greater in other places, but those who have experienced the advantages arising from such campaigns will scarcely grudge the money required.



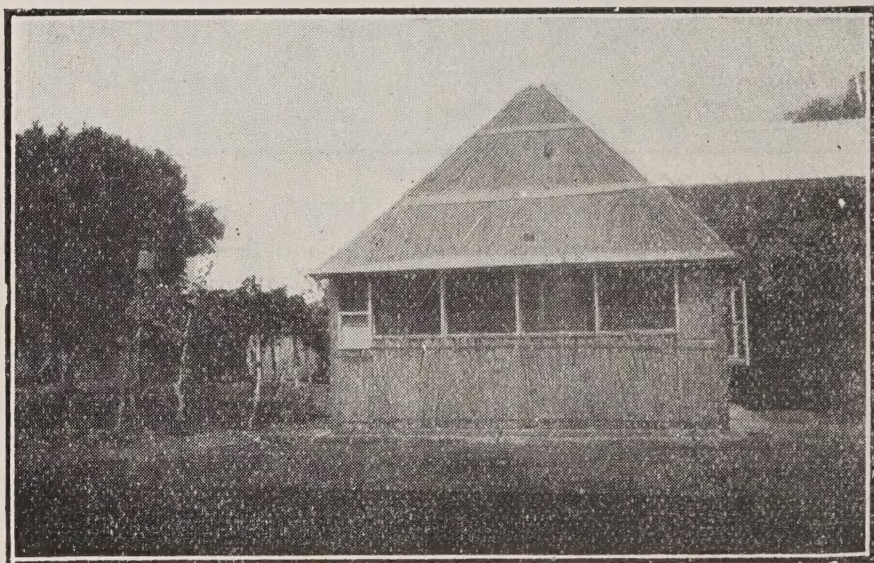


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folding, canvas and steel, with muslin box-shaped mosquito net.
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HOSPITAL, KOMATIPOORT.
Mosquito proofed all round the verandah with netting.
Mesh, 16 to the inch.



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which about 3 in. thick of reeds is laid. Doors, windows
and ventilators mosquito proofed with netting.
Mesh, 16 to the inch. Cement floor.
